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Cover: John Passi's painting of a hatching leopard tortoise, *Stigmochelys pardalis*, was voted best in show for herp artwork at the January 26 virtual meeting of the Chicago Herpetological Society. The artist explains: "I have been painting since I was six, raising tortoises for over 30 years, and a member of the Society also for over 30 years. This painting was my first hatchling over 20 years ago. I have painted many tortoises over the years for both myself and some friends, some of which are on my website <johnpassifineart.com>."

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Notes on the Herpetofauna of Mexico 39: Updated Inventory of the Herpetofauna of the Chipinque Ecological Park, Municipalities of San Pedro Garza García and Monterrey, Nuevo León, Mexico

David Lazcano [1], Brian R. Pérez-González [1], Juan Antonio García-Salas [2], Emma P. Gómez-Ruiz [3] and Larry David Wilson [4]

Abstract

Chipinque Ecological Park is located in the municipalities of San Pedro Garza García and Monterrey in the Mexican state of Nuevo León. This park dates from the 1940s and encompasses an estimated 1791 hectares. There are small springs and trails in the park; it has a single paved road. The park has an altitudinal gradient that ranges from 600 meters above sea level (masl) to 2200 masl and has a steep sloping topography and different types of vegetative communities. We completed 25 days of sampling between May and November 2019, with an effort of five effective hours of herpetofaunal search each day starting at 0900 h and ending at 1500 h. As a result of a literature search, we found that there have been 46 species reported from the park, comprising seven species of frogs, 16 of lizards, and 23 of snakes. As a result of our field samplings, 163 individuals were found, corresponding to 13 species of the families Phrynosomatidae (five species), Anguidae (one species), Scincidae (one species), Sphenomorphidae (one species), Teiidae (one species), Colubridae (three species) and Elapidae (one species), for a total of nine species of lizards and four species of snakes. Regarding the diversity of species, the Shannon index showed a result of 2.55, with an effective number of species of 12.87, indicating low diversity.

Keywords: amphibians, Nuevo León, Parque Ecológico Chipinque, reptiles

Resumen

Parque Ecológico Chipinque está ubicada en los municipios de San Pedro Garza García y Monterrey en el estado de Nuevo León en México. Este parque data de la década de 1940 y abarca aproximadamente 1.791 hectáreas. Hay pequeños arroyos y veredas en el parque; también tiene un solo camino asfaltado. El parque tiene un gradiente altitudinal que va desde los 600 metros sobre el nivel del mar (msnm) hasta los 2200 msnm y tiene una topografía de fuerte pendiente y diferentes tipos de comunidades vegetativas. Realizamos veinticinco días de muestreo durante los meses de mayo a noviembre de 2019, con una duración cada día de 9:00 am a 3:00 pm, abarcando cinco horas efectivas de búsqueda de herpetofauna. Como resultado de la búsqueda bibliográfica, encontramos que hay 46 especies reportadas en el parque, incluidas siete especies de ranas, 16 de lagartijas y 23 de serpientes. En los muestreos de campo se encontraron 163 individuos, correspondientes a 13 especies de las familias Phrynosomatidae (cinco especies), Anguidae (una especie), Scincidae (una especie), Sphenomorphidae (una especie) y Teiidae (una especie), los Colubridae. (tres especies) y Elapidae (una especie), para un total de nueve especies de lagartos y cuatro especies de serpientes. En cuanto a la diversidad de especies, el índice de Shannon arrojó un resultado de 2.55, con un número de especies efectivas de 12.87, resultando en baja diversidad.

Palabra Clave: anfibios, Nuevo León, Parque Ecológico Chipinque, reptiles

Introduction

Mexico is a megadiverse country based on its large number of wildlife species. The Mexican herpetofauna is represented by 417 amphibians (mesoamericanherpetology.com; accessed October 2021) and 945 reptiles (mesoamericanherpetology.com; accessed October 2021), approximately 6.8% of the world herpetofauna (Amphibian Species of the World and Reptile Database, both accessed October 2021). It is estimated that about 63% of this fauna is endemic (mesoamericanherpetology. com; accessed October 2021). This wealth of herpetofaunal diversity, as with the other Mexican vertebrate species, is under

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protection in a system of preserves called Protected Natural Areas. Mexico contains 182 such areas decreed under different categories, such as national parks, biosphere reserves, and natural monuments (CONANP, 2017).

Herpetofaunistic biodiversity plays an important role in the balance of ecosystems, as amphibians and reptiles control populations of pests or species that could become pests. They play an important role in the natural cycles of the ecosystem (Hocking and Babbit, 2014). Also, it is important to remember the cultural value of herpetofaunistic species (Ávila-Nájera et al., 2018).

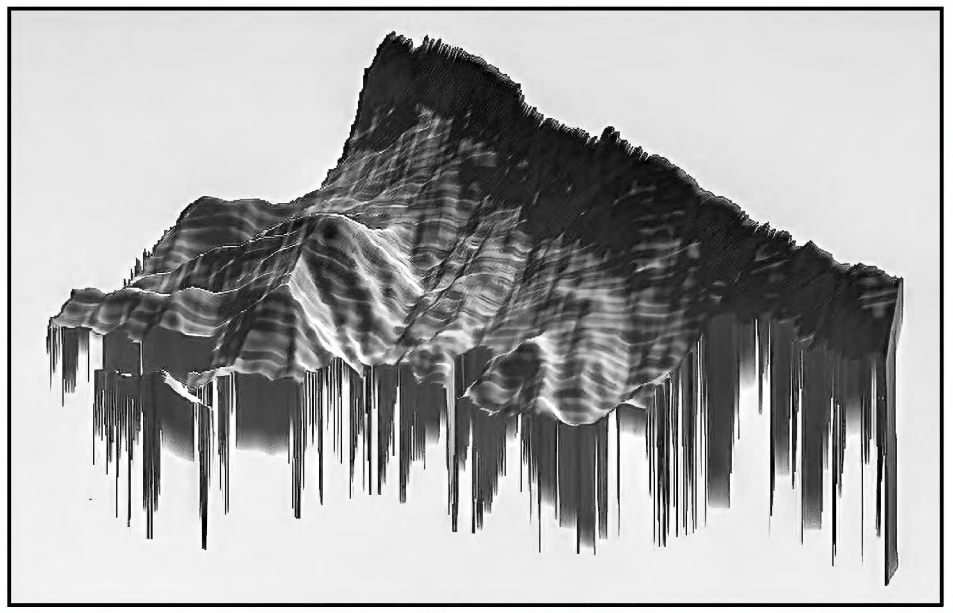
The herpetofauna of the state of Nuevo León has received much attention over the years by a sizable number of authorities within the state (e.g., Martin del Campo, 1953; Aseff-Martínez, 1967; Treviño-Saldaña, 1978; Vallejo-Gamero, 1981; Knight and Scudday, 1985; Benavides-Ruiz, 1987; Canseco-Márquez et al., 2004; Contreras-Lozano, 2006; Lazcano et al., 2009; Contreras-Lozano, 2010; Contreras-Lozano, 2011; Contreras-Lozano et al., 2011; Lazcano et al., 2012; Contreras-Lozano et al., 2012; Narváez-Torres and Lazcano, 2013; Contreras-Lozano et al., 2015; Lemos-Espinal and Cruz, 2015; Lemos-Espinal et al., 2016; García-Vázquez et al., 2016; Nevárez-de los Reyes et al., 2016; Banda-Leal et al., 2017; Lemos-Espinal et al., 2018; Nevárez-de los Reyes, 2018; Nevárez-de los Reyes et al., 2019; and Lazcano et al., 2020). Although many articles are cited above, there is still much to do.

Chipinque Ecological Park is part of the federal protected area Cumbres de Monterrey National Park, located in the physiographic province of the Sierra Madre Oriental. Due to its nature and position within the Sierra Madre Oriental, it has been the subject of several herpetofaunal studies. Nájera-Sánchez (1997) characterized the area ecologically. A preliminary list of the park's herpetofauna was included in Banda-Leal (2002). Lazcano et al. (2006) studied the same area after a forest fire in 1998, and reported the existence of 43 herpetofaunal species. Aguillón-Gutiérrez (2004) and Aguillón-Gutiérrez et al. (2007) documented the bacteria of the herpetofauna of the park, as a method to judge the state of health. García-Bastida (2013) investigated ecological aspects of the Texas alligator lizard (*Gerrhonotus infernalis*). Martínez de Santiago (2017) sampled the herpetofaunal communities during the months of June, July and August of 2017 and reported 16 species. Finally, Arcadio-Rangel (2018) studied the diversity of amphibians during the summer.

The purpose of this paper is to report the results of recent field monitoring on the herpetofauna ofChipinque Ecological Park, correlate this information with that previously published on this subject, and combine it with the other information available on this park.

Plant communities

The main representative plant communities of the Sierra Madre Oriental and the Coastal Plains of the Gulf are present in the Chipinque Ecological Park, where the altitude varies from 600 to 2200 meters above sea level (masl). The presence of these plant communities has promoted an increased interest in the application of conservation strategies within the Park. Alanís



Three-dimensional profile of the Chipinque Ecological Park. Graphic created by Brian R. Pérez-González.

Flores et al. (1995), based on scientific and taxonomic studies of this section of the Sierra Madre Oriental, described the different plant communities in the park, i.e., submontane scrub/matorral, oak-forest, pine-oak forest, and oak-pine forest. Below we briefly characterize these plant communities

Submontane Scrub/Matorral

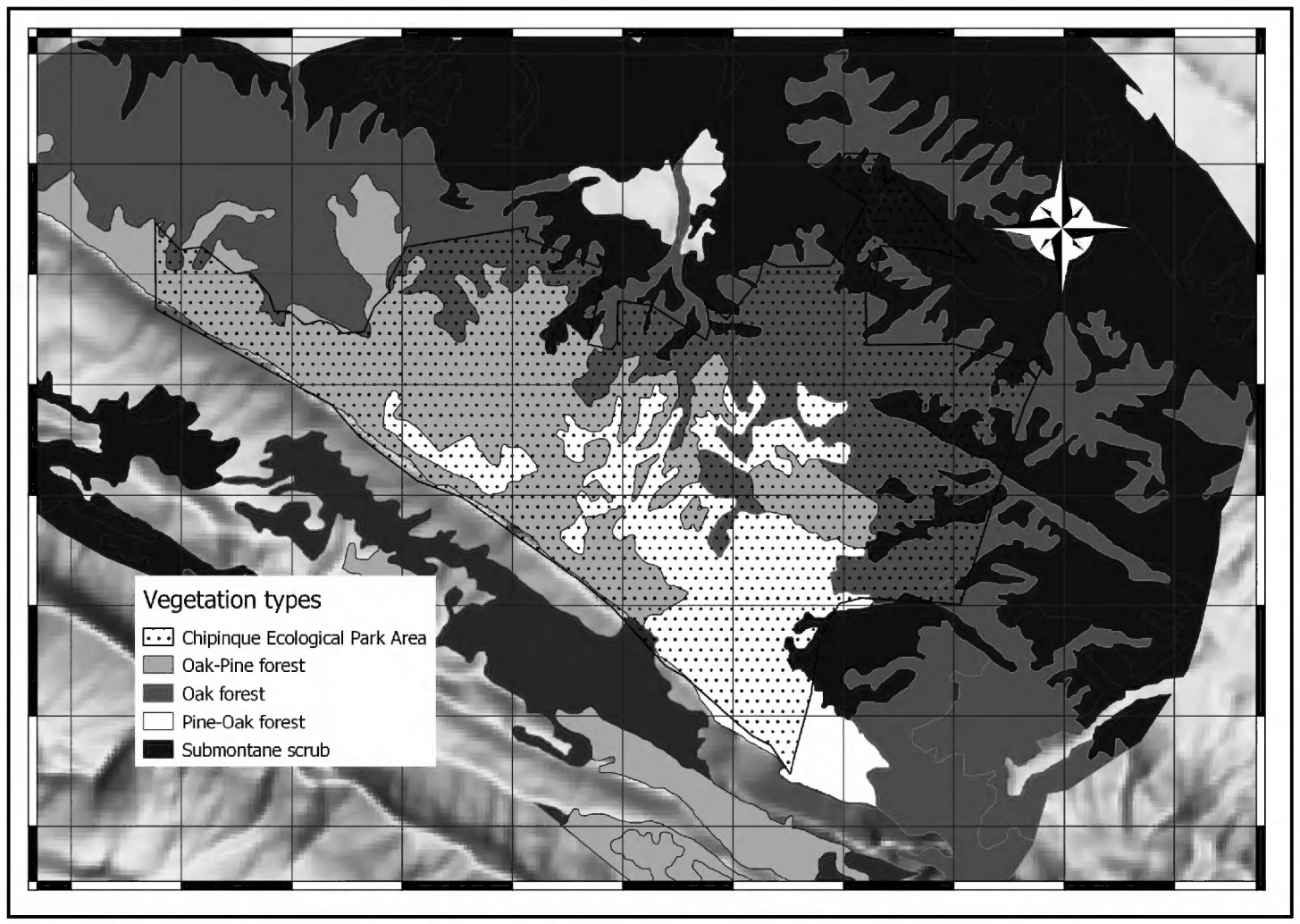
This plant community is a very rich, bushy, dense formation, easily distinguishable from the others. The size and distribution of the dominant and co-dominant species depend largely on the disposition of water, soil thickness, and fertility. This community covers the lower slopes (600 to 1200 masl), which are widely distributed within the park, unlike the subhumid forests found on the highest slopes (1200–2200 masl). The most abundant and dominant species of this community found in the park are: *barreta* (*Helietta parvifolia*); *anacahuita* (*Cordia boissieri*); *tenaza* (*Pithecellobium pallens*); and blackbush acacia (*Acacia rigidula*). In some areas of low humidity, with rocky calcite and mainly thin soils, spiny species predominate. These species are *huizache* or sweet acacia (*Acacia farnesiana)*, Mexican holdback (*Caesalpinia mexicana)*, and mesquite (*Prosopis glandulosa*).

Oak Forest

This community of temperate forests is most abundant from 900 to 1200 masl. The main elements of the oak forest are trees and shrubs between 15 to 20 meters in height, *Quercus* being the dominant genus. The following species are typical: loquat-leaf oak (*Q. rhysophylla*); white oak (*Q. polymorpha*); Lacey oak (*Q. laceyi*); Virginia live oak (*Q. virginiana*); Chisos oak (*Q. canbyi*); and white oak (*Q. laeta*), with which are associated *madroño* (*Arbutus xalapensis*), black cherry (*Prunus serotina*) and Mexican walnut (*Juglans mollis*).

Pine-Oak Forest

This plant community contains specimens of pine trees in low density. The distribution of this forest is between 1075 and 2220 masl; it is an open community of pine species with heights of 10 to 20 m, commonly associated with oaks and *madroños*, which are rare as pure groupings. The characteristic species are twisted-leaf pine (*Pinus teocote)* and white pine (*Pinus pseudostrobus*). Some of the oak forest elements are found here in moderate density. They are associated with oak trees such as



Plant communities in the Chipinque Ecological Park. Map created by Brian R. Pérez-González.

loquat-leaf oak, white oak, Lacey oak, Virginia live oak, Chisos oak and white oak (*Q. laeta*). Pines are rarely found in a pure stand, but are associated with the oaks and *madroños* in the area.

Oak-Pine Forest

This temperate forest community is most abundant at 975 to 2200 masl. The main elements of the oaks are trees and shrubs between 15 to 20 meters in height, with *Quercus* the most dominant genus. The following species are typical: loquat-leaf oak, white oak, Lacey oak, Virginia live oak, Chisos oak and white oak, with which are associated *madroño* and black cherry. Another associated species is Mexican walnut. Pine forest elements are also found at low density.

Methods

This study consisted of 25 sampling days along different trails, dirt pathways, dirt roads, and the only paved road of Chipinque Ecological Park during the months of May to November 2019 with a duration from 0900 h to 1500 h. (Rueda, 2006, Campbell and Christman, 1982). We searched thoroughly in all the different vegetation communities and substrates. The substrates of the park were defined according to what was previously investigated (Nájera-Sánchez, 1997; Banda-Leal, 2002; Aguillón-Gutiérrez, 2004; Lazcano et al., 2006; Aguillón-Gutiérrez et al., 2007; García-Bastida, 2013; Martínez de Santiago, 2017; Arcadio-Rangel, 2018). The substrates were: ground rock, ground trunk, rock wall cracks, leaf litter, tree, rock wall, and terrace. The species observed were photographed when possible, to later identify them at the species level from the photos through the use of taxonomic keys and field guides (Smith and Taylor, 1966; Behler and King, 1979; Flores-Villela et al. 1995; Lemos-Espinal, 2008; Lemos-Espinal et al. 2015; Lemos-Espinal and Cruz 2015; Lemos-Espinal et al. 2018). Other data recorded were the coordinates of the observation, the type of vegetation where it was located, substrate, humidity, the body temperature of the specimen along with that of the substrate, environmental condition, altitude, activity, the kilometer of the road and the season.

We arrayed the collected data in spreadsheets, where we wrote down the data in columns. To analyze the level of diversity of our sample we used the Shannon-Wiener Index, which reflects the heterogeneity of a community based on two factors: the number of species present and their relative abundance. Conceptually it is a measure of the degree of uncertainty associated with the random selection of an individual in the community (Shannon and Weaver, 1949).

We updated the species list by searching all the literature documenting the herpetofauna of Chipinque Ecological Park, looking for official lists of the species of the park, and updating the taxonomy of the species according to the list of species from Nevárez-de los Reyes et al. (2016).

The conservation status of the species was reviewed in the Official Mexican Standard NOM-059-SEMARNAT-2010, in the system of the International Union for the Conservation of Nature (IUCN), and via the EVS vulnerability index taken from Wilson et al. (2013 a, b).

Results

Our trips lasted for 25 days, during which 163 specimens were observed, those corresponding to 13 species; they belong to seven families with nine species of lizards and four species of snakes. No new species were recorded for the area. Table 1 adds the species mentioned in the literature plus the species found in the sampling of this work.

Three of the species we found are given protected status in Standard NOM-059-SEMARNAT-2010; one of them is consid-

Table 1. A comparison of the herpetofuana documented by this study in Chipinque Ecological Park with that reported from studies in various other montane sites in Nuevo León.

Localities and dates of field studies	Number of species		Source
	Observed in field	Reported from literature	
San Antonio Peña Nevada, 2000–2002	19	32	Lazcano (2005)
Sierra Picachos, 2005–2006	33	47	Contreras-Lozano (2006)
Cerro de la Silla, 2005–2006	17	46	Lazcano et al. (2009)
Cerro el Potosi, 2006–2007	7	33	Contreras-Lozano et al. (2011)
Cerro el Potosi, 2006–2007	16	41	Contreras-Lozano et al. (2012)
Topo Chico, 2009–2011	7	66	Lazcano et al. (2012)
Parque Nacional Cumbres, 2009–2011	50	110	Contreras-Lozano et al. (2015)
Sierra Gomas, 2010–2013	61		Nevárez-de los Reyes (2018)
Parque Ecologico Chipinque, 2019	13	46	This report

ered threatened (A): *Scincella silvicola*; two species are given special protection (PR): *Sceloporus grammicus, Tantilla rubra.* The Shannon index gave us a result of 2.55, indicating a relatively low biodiversity.

Discussion

The general knowledge of the herpetofaunistic species in Chipinque Ecological Park is widely documented; this is due to studies previously carried out in the park and of those reported by park rangers' findings. To this date, 46 species have been reported for the Chipinque Ecological Park (representing 63.94% of the total of 139 species of herpetofauna in the state of Nuevo León according to Nevárez-de los Reyes et al. (2016). It is unlikely that many more species will be found since few have been added over time and no new ones have been reported recently.

Of the 46 species reported for the park, only 13 species (27.7%) were found during our field work. No amphibian species were found, and only a few snake species, mainly due to the environmental conditions, as the days when the sampling was done were very dry (relative humidity of 10–15%). Another factor contributing to the scarce observations may be that the accessible areas of the park are visited daily by many people.

Table 2. Species and number of specimens found in the different plant communities in the Chipinque.Ecological Park.

Taxon	Oak forest	Oak-pine forest	Pine-oak forest	Submontane scrub
Anguidae				
Gerrhonotus infernalis	3	11	5	
Phrynosomatidae				
Sceloporus cyanogenys	52	13		10
Sceloporus grammicus	7	1	1	
Sceloporus olivaceus	10	2	1	3
Sceloporus parvus			1	
Sceloporus torquatus	1	12	10	
Scincidae				
Plestiodon dicei	2		2	2
Sphenomorphidae				
Scincella silvicola	2	1		1
Teiidae				
Aspidoscelis gularis				9
Colubridae				
Drymobius margaritiferus		1		
Drymarchon melanurus		1		
Tantilla rubra		1		
Elapidae				
Micrurus tener	1			
Total	78	43	20	25

The white-nosed coati (*Nasua narica*) is one of the main predators of herpetofauna in the Chipinque Ecological Park. All photographs by Brian R. Pérez-González.

Sceloporus torquatus.

A pair of *Gerrhonotus infernalis*.

Tantilla rubra.

Sceloporus olivaceus.

Sceloporus cyanogenys.

Sceloporus grammicus.

Sceloporus parvus.

Scincella silvicola.

Most snakes are secretive and sensitive to their environment; any human activity can cause them to hide. We were able to confirm the presence of several snake species only because of shed skins that we found and could identify.

Many amphibian and snake species have nocturnal habits (Lemos-Espinal, 2008; Conant and Collins, 1988), so sampling at night could increase observations of these nocturnally active species. In this study it was not possible to carry out field work in the park after 2000 h. Because of the park's very strict closing time, no one is allowed to walk around the premises after hours.

Our findings are summarized in Table 1, expressing the species found in this study and other past studies, and Table 2, listing the species found in the different plant communities. To date the most representive and charismatic species in the park seems to be *Gerrhonotus infernalis*.

Conclusions

In Chipinque Ecological Park 46 species of herpetofauna have been reported in the literature, but in our field samplings during May–November 2019 only 13 species were found. It is likely that the number of observed species will increase gradually in the next few years, as more updates are made to the park's herpetofauna and the collection effort increases.

The presence of rock walls, fallen logs, and bark in the different biotic plant communities greatly influenced habitat use; if these elements were present there was an increase in number and frequency of each species.

We don't have any idea how climate change will affect the herpetofauna of the park. This is something that should be addressed in future studies.

Acknowledgments

Members of the Herpetology Laboratory of the Faculty of Biological Sciences. An immense thanks to Chipinque Ecological Park authority for allowing us to carry out this research in their facilities and to the rangers for their important contributions. No scientific collection permit was required because no specimen was collected

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The "Magnificent Seven" of the Suizo Mountain Project Ride Again

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We all die. The goal isn't to live forever, the goal is to create something that will. — Chuck Palahniuk

Prologue

I have never forgotten the total humiliation that I faced when I sought help in finding my first wild Gila Monster. The figurative saying "doors slammed in my face" applies. Finding that first monster was hugely important to me. And I maintained a grudge of sorts against those who so rudely refused to help me with my quest. (I got over it.) Once I became proficient at finding them (if such a thing is possible), I made it a point to try never to say "no" to anybody else who wanted to see that first wild Gila Monster of their own. Perhaps that is why I said "yes" to Jim and Kathy Bricker. It greatly helped that the couple hailed from back East, and would only be underfoot for one day. It also helped that they sucked up so sweetly. At the time, Kathy had just read the *Bulletin* that contained the piece written by Team Barten and Repp. The cover of that issue showed this ugly dude leaning on the flank of a 50-foot-long rattlesnake, and the text described a group from Chicago tripping over Gila Monsters (Barten and Repp, 2000). I don't remember exactly how their request came my way, or how many "thou shalt *not*" demands were issued as a response before I finally acquiesced. The fact is that in early spring of 2001, finding them a wild Gila Monster was *not* a gimme proposition. Even with the good Dr. Gordon Schuett and me as their guides, the odds were only about 10% in their favor. At that point in time, there were probably five other local people who could have given them better odds. But those were the same five people who slammed that proverbial door in my face so many years before. In short, we were their best bet.

My mentality at the time was that I was doing Jim and Kathy this great big favor by agreeing to be their guide. The fact is, I was walking in tall cotton by having them as guests. I have had over 20 years to get to know them better, and I am *still* learning of their great deeds in saving this planet. Kathy is an absolute powerhouse of a go-getter, and her husband Jim does everything in his power to help her. The team of Kathy and Jim Bricker are a one-two knockout punch when it comes to performing great deeds for the betterment of our planet. Were I to make a list of the amazing people who Gordon and I guided to our study plot through the years, that list would include some of the greatest herpetologists, naturalists, and biologists in the world. If I listed them all, the reader would think me a braggart *and* a name dropper. But if you took the combined conservation accomplishments of each and every one of these people and piled them up, their collective efforts would not even be close to the dynamic results of Team Bricker. Jim's experience as a biology professor grounded him thoroughly in pulling his weight with everything that his fireball of a spouse did. As evidenced in many of the figures to follow, Jim is also a good photographer. Kathy knew how to work the big money people in both the political and environmental arenas. Love may make the world go round, but a spinning planet does *nothing* to generate the funding to save itself from the human race. An excellent example of how Kathy approached fund-raising can be found in Bricker (2007). One must display finesse with people skills, and demonstrate impeccable organizational craftsmanship to land the whopper grants that she managed with the various big time nonprofit organizations that she spearheaded through the years.

But not only were the Brickers big in issues of world-wide conservation, they also had great big hearts. When they took on the mission of caring for two unwanted Reticulated Pythons, they demonstrated something other than big hearts. As Figure 1 demonstrates, they had *big snakes* as well! (See also Bricker,

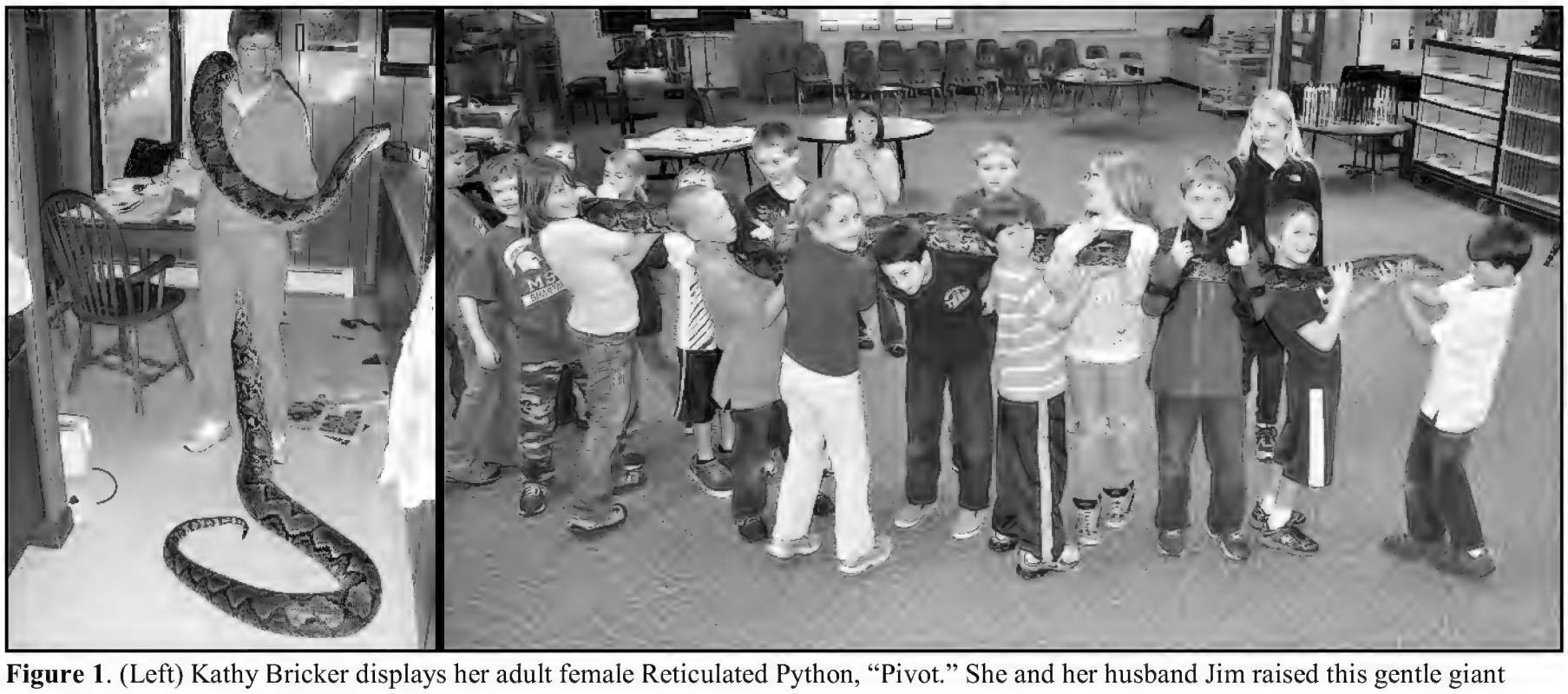

Figure 1. (Left) Kathy Bricker displays her adult female Reticulated Python, "Pivot." She and her husband Jim raised this gentle giant from hatchling size. (Right) Eighteen children at Shay Elementary School somewhere in Michigan are having an experience that they will *never* forget! The educational aspects of what Team Bricker provided with their gentle giant of a python were *priceless*. This author would have sold his young soul to have had such an opportunity as this. Images by Team Bricker.

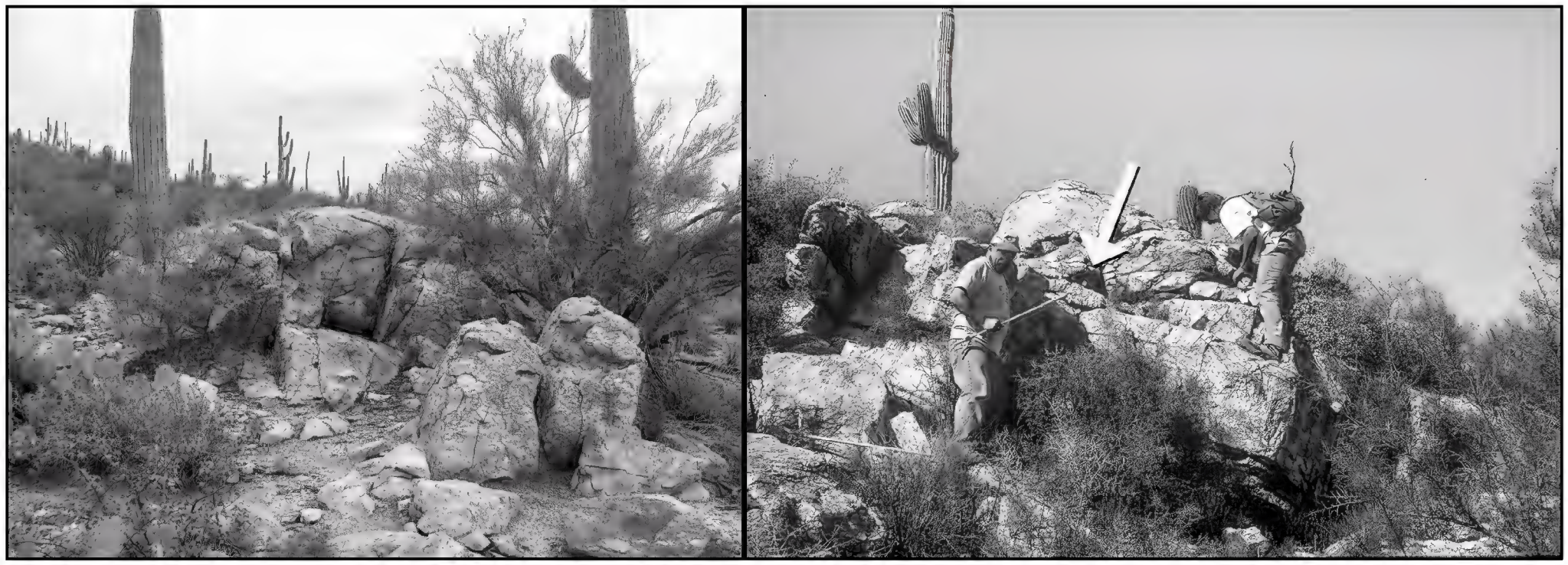

Figure 2. (Left) *Atrox* Den number 1, AD1. This was the first aggregate den of *Crotalus atrox* to be monitored in the Suizo Mountain radio-telemetry study. Image by the author. (Right) Jeff's Den, with Gordon W. Schuett and the author included for both size perspective *and* our locations on the day that we captured *Crotalus molossus* #1 (Cm1). The two of us are actually rebuilding the den after the capture of Cm1, later named "Harry." The arrow shows Harry's location on the day of his capture. See also Figures 8 and 9. Image by David L. Hardy, Sr., 16 March 2001. These and all remaining figures in this article were taken in southern Pinal County, Arizona.

1993.) This column is rapidly heading toward a Jim and Kathy super-suckup affair, so the author will rein it all in by adding a brief resume and suggested reading list at the end of this column. Can we get back to herping again? The author has just about shot his wad with his own limited people skills!

The set-up for a perfect day

When Gordon Schuett and I began what would one day be dubbed "The Suizo Mountain Project," we started it with seven transmitters in hand. I should rephrase that last sentence. *Gordon* had the seven transmitters in hand. He wanted to start a radio-telemetry project with them. My contribution to the effort would be to share the best damn study plot ever to occupy the shade of saguaro cacti. We speak of Iron Mine Hill, which is an outlier hill of the Suizo Mountains (Repp, 2015). He had the transmitters, and I had the potential study plot, coupled with the willingness to work it with everything I had. All in all, it was a good exchange for both parties involved. The first day that Gordon ever clamped eyes on Iron Mine Hill, he knew it was good. The first transmitter was quickly spoken for. Even though Gordon probably thought that all seven of his transmitters would one day occupy the innards of Western Diamond-backed Rattlesnakes (*Crotalus atrox*) (often shortened to "*atrox*" from this point on in the narrative), the first transmitter wound up being designated for a Gila Monster (*Heloderma suspectum*) (called many universally understood names in this column). The story of how this change of plans occurred has already been documented in a long-story format (Repp, 2020). The short story is that on 10 March 2001, *Heloderma suspectum* #1, or the less formal and more often utilized "Hs1," was sent northward to Glendale, Arizona, with Gordon for the surgical implantation of one of Gordon's transmitters. On 16 March of 2001, Hs1 was released back into the wild. By the end of that same day, two more transmitters were spoken for. One went to female *Crotalus atrox* #1, or "Ca1." The second went to a male Black-tailed Rattlesnake, who became *Crotalus molossus* #1, also known as "Cm1." I will mostly be calling Black-tailed Rattlesnakes "*molossus*" throughout the remainder of this column. One week later, on 24 March 2001, both rattlesnakes were released at their capture locations. On 22 March 2001, while Ca1 and Cm1 were still in Gordon's hands awaiting his next visit, my friend Jeff Moorbeck and I went out and snagged a second female *atrox* for our study. She became Ca2. When Gordon visited the plot on 24 March, he received Ca2 to take home with him. But we also captured another female *atrox*, Ca3, and yet another *molossus*. This one was a female, who received the designation of Cm2.

We'll go through all this a little more slowly now. In addition to numbering our subjects, we also hung names on them. My goodness gracious is that ever taboo in most biological circles! I can just imagine some of you readers groaning whilst uttering: "*You named your study animals*? How precious, and isn't that *special*?" My answer to that, dear readers, will be the same to you as it was all of my *smart-ass* wildlife biologist friends at the time. We named them because it helped us to *remember them*. And as far as bunny foo foo tree huggers go, allow me to say that both Schuett and I have some *really* hard bark on us. Let's put this notion of names as a memory tool to a little test. It has been over ten years since I have rattled them all off in one paragraph from memory. I will do that, and maybe help explain just who these animals were, and where they were captured in the process.

Ca1 was named Ruth, after my mother. Ca2 was named Dianna, after my wife. Ca3 was named Patricia, after Gordon's mother. All three of these female *atrox* came from *Atrox* Den #1, or AD1 in abbreviated form. AD1 was situated on the lower southern flank of Iron Mine Hill. Rather than burn a thousand words describing it, I'll just show an image (Figure 2, left). Cm1, "Harry," was captured in a different *atrox* den that carried the name of Jeff's Den. Cm1 was named after the famous herpetologist Harry Greene, who at the time was doing a radio-telemetry study with Dave Hardy on *molossus* in the Chiricahua Mountains near Portal, Arizona. Jeff's Den was named after Jeff Moorbeck, the person who found it. It was the first *atrox* den ever found by any of my core group that harbored anything but

Figure 3. (Left) An image of the pre-release antics of Schuett and Repp. The snake in this image is Ca2, Dianna. (Right) A pre-release portrait of Ca3, Patricia. See text for all details of this and other figures in this column. Images by Team Bricker.

atrox inside. Jeff's Den was located just to the north of Iron Mine Hill, on the lower southern flank of the Suizo Mountains proper. While Jeff's Den played only a bit part in the Suizo Mountain Project, we present the reader with an image anyhow (Figure 2, right). After giving the name Harry to the male snake, Cm1, it only made good sense to name the female *molossus* that we captured one week later "Kelly." The naming of Cm2 was done to honor Dr. Kelly Zamudio, Harry Greene's academic dynamo of a wife. Kelly (the snake) was found at a nondescript location on the upper eastern slope of Iron Mine Hill. And in the biblical way of "the first shall be the last," we mention Hs1, who was the first study subject to earn his name. We dubbed him "Geronimo," for reasons that will be explained soon. Geronimo was captured on the upper west center of Iron Mine Hill.

The situations these animals were in on 1 April 2001, when Team Bricker and I rolled into the usual Iron Mine Hill parking spot was as follows: Hs1 (Geronimo), Ca1 (Ruth) and Cm1 (Harry) were all in their respective places in the Suizo Mountains. Their transmitters were surgically implanted and blipping away. Ca2 (Dianna), Ca3 (Patricia) and Cm2 (Kelly) were all with Schuett, transmitters implanted, but needed to be released at their capture sites. We had one transmitter left to burn, and by the end of this day, it found a future home. The finding of this last study animal allowed Schuett and Repp to hang out with our own version of the "Magnificent Seven." Team Schuett and Repp put on quite a show this day, as did the study animals, and the Brickers were the perfect guests to enhance the performance.

April Fools' Day 2001

At precisely 0730 hours on 1 April 2001 we arrived at the hallowed Iron Mine Hill parking spot. Team Bricker and I were packed tight into the cab of my dinky pickup truck. (Poor people have poor ways.) Gordon was already there. The day was guaranteed to provide entertainment right from the start, for he had the three rattlesnakes mentioned above with him, each in its own bucket. The flandickery that was to follow our arrival was a form of Crotalus Christmas, where instead of wrapped gifts to open, we had buckets with lids. The normal procedures for pre-release of any of our subjects involved final health assessments, microchip (hereafter called "PIT tag") readings, the final check of transmitter frequency, and basic top-down photographs. (The word "PIT" is actually an acronym for "Passive Integrated Transponder." PIT tags are slightly larger than a grain of rice, and are inserted under the skin of the subject. Each PIT tag contains a unique code that precisely identifies the subject in question. They last almost forever. Once a subject is injected with a PIT tag, that subject is marked for life.) Team Bricker became more than passive participants from this point on in the day by taking, and later sharing, their photographs (Figure 3). They also willingly helped us transport our buckets all over hell and back. Following these first few pre-release images, we began the crunchy steps of our adventure together. This day began with the short hike to AD1, in order to release Ca2 (Dianna) and Ca3 (Patricia).

As was customary with our approach to AD1, before doing anything else, we circled the den. At the halfway point of said circle, we observed a large adult male *atrox* coiled just outside the east entrance to AD1. The place that he roosted was actually on the opposite side of the boulders that the *atrox* action normally happened. At the time, we were not adding males to our study. Hence, he was left as found, although we visited him several times throughout the course of the day just to observe what he was doing. The time that we first noted him was 0916 hours. Each time we visited him, I photographed him. By doing so, I was photographing a dead snake. But I did not know that at the time. Moving along with the day, just after innocently recording "CaDead" at AD1, Ca2 and Ca3, Dianna and Patricia respectively, were released into AD1. My notes indicate that the rather unceremonious dumping of both was over at 0923 hours (Figure 4). Since we still had Cm2 (Kelly) to release, and the faint signal for Geronimo indicated that he was also on the far side of Iron Mine Hill, I launched into high gear in order to get up and over to the top of our hill as quickly as possible. There was no way in hell I was going to be a considerate host at this point in my life. Our guests could either could keep up or catch up. Fortuitously for everyone involved, they were fit, and had no trouble following me. But I was a good 10 meters ahead of them when, at 0925 hours, I got my first visual of what would become study animal number 7. There was no time to admire the *magnificent* beauty of one of the prettiest Gila Monsters that I have ever seen. All I saw was the flash of an 18-inch-long, orange and

Figure 4. (Left) The bucket brigade assails AD1. A bewildered Kathy Bricker looks on while an animated discussion ensues between the two architects of the Suizo Mountain Project about exactly where to put the two rattlesnakes about to be released. (Right) The poker face belies the unbridled enthusiasm of the good Dr. Schuett as he prepares to release Ca2 (Dianna) onto the apron of AD1. Images by Team Bricker.

black shape waddling briskly away from me—roughly 20 meters upslope—toward a hole under a massive boulder. If she got into that hole before I got to her, it was "*goodbye number 7*! I'll see you again *never*!"

How I wish there had been time to step aside and say "Why look, Jim and Kathy, here is the wild Gila Monster that you were hoping for. Hasten thee to my side, so that thou canst admire it with me." Hell no, it went nothing like that! There was time only to react. I threw the antenna to the ground. Such was my angst in going after the escaping monster that I forgot to disconnect said antenna from the receiver box. Hence, as I raced forward with my adrenaline-packed herper's charge, the antenna clattered across the rocky substratum behind me. It could have easily gotten hung up, but that would have only resulted in the cable being torn out of the receiver box. The monster was actually halfway into the hole before I caught up with it. I snagged it by the tail, and whisked it out. "*Gotcha*!" It was next a simple matter for me to grab it by the throat. By then, my three wide-eyed companions were at my side. What happened next had to happen quickly. Gordon had to have its blood for some gawd-awful hormonal study he was doing. In less time than it takes to say it, he had the needle thrust into its tail. And Jim was also Johnny-on-the-spot with his camera. Were this a football game, we had just all performed a "bang-bang" play! (Figure 5, left).

With great reluctance, I must wrench myself away from the narrative to explain a few things. We did not know it at the time, but we had just captured a female Gila Monster. Back then, we were only aware of two sure ways to identify the sex of Gila Monsters. One method involves ultrasound, and we'll just stop right there with that notion. We did *not* have that option. The other method is to inject saline solution into the cloaca. That procedure is normally done in the lab. Were this Gila Monster a male, hemipenes (yes, like snakes, Gilas have two) would pop out during the flushing process. Gordon performed the saline flush on 7 April, and we learned that our Gila was a female. This was the absolute perfect situation for our study. And just by the nature of being there, Team Bricker skewed the dynamics of our normal routine enough to assure that we were exactly where we needed to be at exactly the right time. Our new Gila Monster became Hs2, and we named her "Laura" after Gordon's wife. Since I have just now fetched Laura's stats, I will present them here. I suggested "18 inches long" in the text above. That was actually a good guess. Her snout-vent length was 31 cm (~12.20 inches) and her total length was 44 cm (17.32 inches). I was off

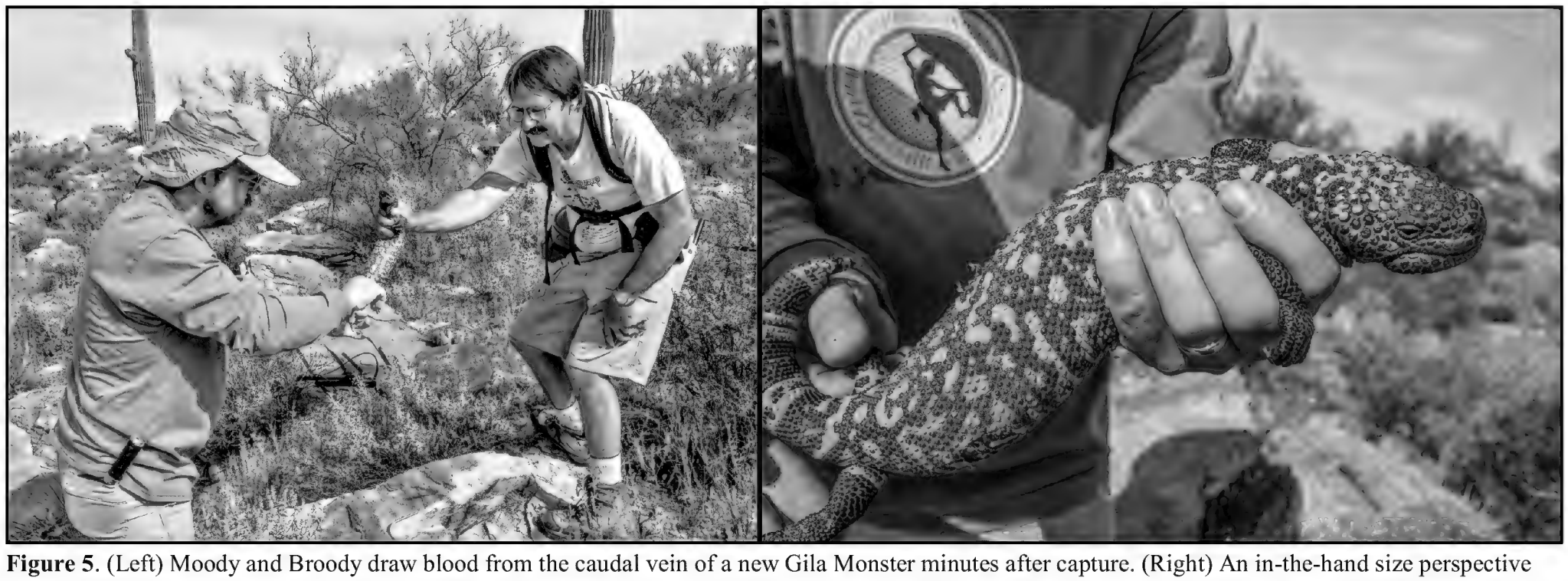

Figure 5. (Left) Moody and Broody draw blood from the caudal vein of a new Gila Monster minutes after capture. (Right) An in-the-hand size perspective image of Hs2, Laura. It should be mentioned that Gila Monsters are protected in Arizona, and the handling and processing of Laura and others like her was done with the proper scientific permits. Images by Team Bricker.

Figure 6. Cm2 (Kelly) four months after her release. As this image clearly demonstrates, she has managed to snag a "plot biscuit" (likely a packrat), and is doing well despite the intrusions of science into her life. Image by the author, 3 August 2001.

Figure 7. Viewed in the foreground of this image, Ca1 (Ruth) is being actively courted by the much larger male *Crotalus atrox* behind her. Image by Team Bricker, 1 April 2001.

by 0.68 inches. I guess that's why we measure these things. Were I to go around spouting her length as 18 inches, the entire herpetology-based portion of the scientific community would be knocked off center by nearly 11/16ths of an inch! Her mass was 423 grams (14.92 ounces). Should the reader wish to know what a 17.32-inch-long, nearly 1 pound lizard looks like when displayed in the hand, see Figure 5. On 1 April 2001, I only knew for sure that two Gila Monsters inhabited Iron Mine Hill. As the notes in my herp journal indicate, I did not know for sure that there were actually three Gila Monsters on our hill until 10 April 2001. I had been able to photograph two different Gilas here in the year 2000. It was only when I got my slide images back that I was able to compare images of Laura with the other two. (To give the reader an indication of how many "for sure" Gila Monsters actually occupied our hill through the duration of our study, the last day we ever processed one was 31 August 2013. The almighty N at that time was 27. But we walked by at least that many more during the course of our study. There is so much more that could be said here, but it is time to jump back into the adventure *du jour*.)

There wasn't a hell of a lot of time to admire Laura once she was in our hands. I would guess that I at least offered to let Kathy and Jim handle her. I'm thinking they declined. But all too soon she was plopped into one of our buckets, and to the top and over our hill went we. Roughly 30% down the other side was the spot where Cm2 (Kelly) had been captured. On this day, for whatever reason, Kelly was a photographic black hole. Three photographers tried to get a suitable image of her, to no avail. Glad I am to be able to share an image of this sweetheart of a *molossus* taken a few months later (Figure 6). There is always something righteously awesome about returning an animal to the wild. My heart was glad when we saw Kelly slither back into her lair.

Our next stop was good old Hs1 (Geronimo). I don't know how much of him that my three companions saw. But since he had a transmitter inside, I was once again leading the charge. As suggested earlier, during the initial phases of our project, Gordon was doing a hormonal study. Once a month, he would draw blood from the caudal vein of our Gilas and *molossus*. I *hated* this aspect of our study, but did everything I could to help nonetheless. At 1007 hours, Geronimo was viewed all the way out of the "Gila hole" under the boulder structure that he occupied. While we prepared to capture him, he began a brisk retreat back into his lair. I tried to stop him by rushing ahead to snag him, but there was no chance. He got away clean! Good! This was our first inkling of Geronimo's prowess at avoiding Gordon's needles. So adept was he at eluding capture that we named him after the legendary Apache war chief. We knew that we would try to catch him again later that day, and moved on to other things.

We next tracked female Ca1 (Ruth). After her release on 24 March 2001, she quickly cleared out of AD1, and began traveling in a south-easterly fashion away from the den. In order to track her this day, we doubled back over the top of the hill, and dropped downward to the lower southeastern bajada of Iron Mine Hill. When the signal led us to her, we found that she had company. We visited the pair three times this day, and all three times, the male was with her. We were hopeful that we would see them mate. They were close to it, but it didn't happen. We have several images of this couple taken throughout the course of the day. We will show the one deemed best (Figure 7). After finishing our first visit to Ruth, we were close to our parking spot. We paid a quick visit to "CaDead" at AD1, and more photos ensued. (No worries, CaDead will be properly explained soon).

There's something about Harry . . .

It was now time to see what Cm1 Harry was doing. We made the short hike from AD1 to the vehicles, and all piled into my dinky Toyota Tacoma pickup. As was customary, one or more of our group hopped into the bed. We drove the network of back roads that took us north of Suizo Wash. Once on the other side of that wash, we hooked east on a road that led toward the Suizo Mountains proper. We parked in the place that allowed us the closest access to Jeff's Den (Figure 2, right), and up the hill we trudged. Once again, we break away from the events of this day in order to describe Harry's spectacular capture. On 16 March 2001, Dave Hardy, Gordon, and I approached Jeff's Den and got our first look at Harry. I could easily burn a thousand words describing the situation, but since I photographed it, we share that image (Figure 8, left). This marked the first time that I had ever seen any other species of snake inside of an aggregate *atrox* den. (I had been visiting *atrox* dens in several locations for ten years at this point in time. There were minimally 30 aggregate

Figure 8. (Left) Cm1 (Harry) as viewed on 16 March 2001. He remained in Jeff's Den for over a month after release. Image by the author. (Right) Harry being hefted out of his crevice home, photographed at the exact moment that it happened (an *in situ* capture photograph). See text for the details behind this capture. Image by David L. Hardy, Sr., 16 March 2001.

atrox dens under our watch by the year 2001.) Observing Harry (who was not yet named Harry) inside that crack with several *atrox* to either side of him *made my heart sing*! But Gordon felt like he just *had* to get a blood sample from this snake in order to satisfy the needs of his earlier-mentioned hormonal study. The very notion of attempting to drag Harry out of Jeff's Den for one measly blood sample stopped that song in my heart cold. Both then and now, yanking Harry from Jeff's Den would be a serious breach of my standards and etiquette toward any snake (or Gila Monster, or tortoise, or chuckwalla) inside any overwintering den. Gordon and I had actually hammered out a written and signed document dealing with this very sort of thing *before* our first visit to Iron Mine Hill. By 2001, I had learned that to drag *any* species of herp out of its overwintering site was to risk losing it forever. That was especially true of any capture that involved any violation to the herp in hand. And yeah, I call sinking a needle an inch deep into the tail to draw a full milliliter of blood out of the caudal vein a *serious* violation! A bewildered Dave Hardy witnessed the terse back and forth between us, no doubt mystified that such a cut and dried decision as a needle stick was causing battle lines to be drawn between the two of us. When I suggested to Gordon that he could have his blood sample *only* if we put a transmitter in this snake, he briefly hesitated, and then nodded. "Yeah, we can put a transmitter in him if you like." Yeah—I liked! *Now* if we yanked him and surgically implanted him with a transmitter, and he left the den, he could run but he could not hide! But we had *not* captured him yet.

Dr. Hardy expressed his desire to photograph the capture attempt. He positioned himself about eight feet below us and waited, his camera aimed upward and ready. I ask the reader to once again refer to the right-hand image in Figure 2. Note the arrow that points to Harry's location in the moments before capture, and please read the caption. The base of Jeff's Den is a many-layered series of massive caprock slabs, crowned on top with two large half-spherical caprock boulders. These two crowning boulders abut each other, flat portion down, and a network of crevices run beneath and between them. Harry was initially coiled in the open gash between the crowning boulders. There was a convenient yet narrow ledge that ran the length of these boulders, said ledge actually being the top of the slab that the flat portion of the crowning boulders rested upon. When the capture was initiated, Gordon stood broadside to Harry, his shoulders level with Harry's coiled form. I stood on the ledge one level up from Gordon, and to his right in order to be out of his way. The right-hand image of Figure 2 accurately depicts the situation and location of each of us. Gordon's *wimpy* tongs clamped around Harry at about mid-body, and he gave Harry a tug. Faster than it takes to say it, the posterior third of Harry spewed out of his coil spot, dangling downward out of the den opening. I was looking straight down at the action. With powerful surges (*molossus* are *very* strong) Harry began inching out of the grip of the tongs. "*The tongs won't hold him*!" Gordon cried. (By March of 2002, we had learned to hand-grab the rear of *any* snake that was escaping in such fashion. You *can't* let such a snake in a situation like this get away.) About the time that Harry's rattle disappeared into Jeff's Den (and the boisterous cussing out of Schuett began to issue from my gullet), I noted that the smart end of Harry was going upslope in the crevice of the crowning chunk of caprock closest to me. He was coming right at me! There was a stack of smaller boulders that were blocking my view of Harry's movements. I began to thoughtlessly toss these boulders to one side of the den with reckless zeal. One of these rocks—roughly the size of a large coconut and massing over 3 kilograms (6+ pounds)—went sailing over Hardy's left shoulder. It came to within inches of bashing his head in. Amazingly, he demonstrated *zero* reaction to that flying rock. He just stood his ground and did not even flinch while his camera kept whirring away. (He later admitted that he was too busy shooting to see the flying rock that nearly dashed his brains out). By removing some of those boulders, and almost killing Dave Hardy in the process, a hole opened up. Said hole was roughly 18 inches deep by eight inches in diameter. Harry's head slid into view at the bottom of that hole. His chin and throat were sliding across the flat surface of the massive slab that supported the topmost two boulders. In the split-second that followed him coming into view, he began an attempt to finish his retreat by entering a tight crevice under one of the crowning boulders. This crevice was a poor choice of an escape route, as it only allowed less than a half-inch of his snout to enter. He was

obviously stuck, but kept trying to worm that hefty head of his deeper into the crack anyhow. If I didn't do *something*, all was lost. *Eye wanted that snake*! Without any further thought about the matter, with unbridled confidence, I stuffed my arm into the hole I had created. That is how I know that hole was 18 inches deep, as my arm went all the way to my elbow before my index finger scored a direct hit between Harry's eyes. It was a simple matter for my right thumb and middle finger to close in on the neck to either side of his head. The next thing I knew, up and out of the hole I had created came Harry. In the process of lifting him out, I was able to grab hold of Harry's body with my left hand, and Gordon got hold with his tongs below that grab. We had him! And Dave Hardy got the best capture-related action image of me ever taken. We *all* have a favorite image of ourselves with a herp in hand, and the right-hand image in Figure 8 is mine.

I want to discuss the reaction that some herpers may have when viewing an image like that of the bare-handed grab of Harry. In April of 2005 I was invited to speak to the Tucson Herpetological Society (THS). When I accepted that invitation, I received an email that requested several action items. This so they could properly announce my presentation in their newsletter. One of the items requested was a favorite image of myself. The request was very specific. They not only wanted an image of me, they wanted a herp, "*preferably a study subject*" included within the framework of this photo. They wanted a favorite image of me with a study subject? Nothing to it! The image of Harry's capture immediately popped into my head. Since Dave Hardy's image was a 35mm slide, it had to be scanned. I took it to a friend for scanning, and *that* was the end of *that*! The image was shot down *before* the editors even got the chance to see it! The person who scanned it copied the president of the THS when he emailed the digital image of Hardy's slide to me. In the text of this email, which was supposed to be sent to me alone, he lodged a strong protest about the image. He claimed that they didn't need any images of "someone pretending to be Steve Irwin" in the THS newsletter. *Me? Pretending to be that asshole*? I went *ballistic* on him about this Steve Irwin bullshit. I also told him that this was none of his business in the first place! He then publicly retorted with "What if some impressionable teenager should see you doing this, and try it himself?" At that point, I was beside myself with rage about it all, and fired back something about culling the herd and getting rid of the dumb ones. Then the president jumped right in there, and got all law dog and presidential on *me*—the Herp King of Arizona! (The poor guy actually thought that being president of a herp society meant something.) Said he: "We take a dim view of people showing off with rattlesnakes." *Showing off with rattlesnakes*? Well, I am also allowed to take a dim view stance on a lot of things. One of *my* pet peeves is people who do not even study venomous reptiles telling us what we should and shouldn't do. This image is *not* me showing off, it's me saving the day! Had Harry escaped this capture attempt, we may have *never* seen him again. As the result of the capture, we collected over 16 months of data on him. He visited 28 different sites during the first year of the study. What would have been site number 29 was actually site #1—Jeff's Den. Fidelity! He entered Jeff's Den on 8 November of 2001, and emerged on 29 March 2002. When we saw him the day he egressed from Jeff's Den, I was inspired to write "Harry has never looked better," in bold letters on his data sheet for that day, and both Gordon and I initialed that statement (see also Figure 9). For a snake to thrive in spite of enduring all the rigors of science—in a drought year no less—was remarkable indeed.

In wrapping this rant up before it gets any worse, I do want to defend my actions enough to remind the reader that no matter how a rattlesnake is captured, there is risk involved. Using clear plastic tubes is widely recognized as the "safest" way to proceed. But I have first-hand knowledge of five different envenomations occurring as a result of using tubes. One happened as the result of trying to get the snake's head into the tube, two more when the snake unexpectedly doubled back inside the tube, and two more when the snake went all the way through the tube. As for the capture of Harry being deemed as reckless, there were easily 20 other captures that were *far* more dangerous than this one. I have captured and processed roughly 200 rattlesnakes through the years, using several different "safe" methods. Harry's capture was the *only* time I have ever performed a bare-handed

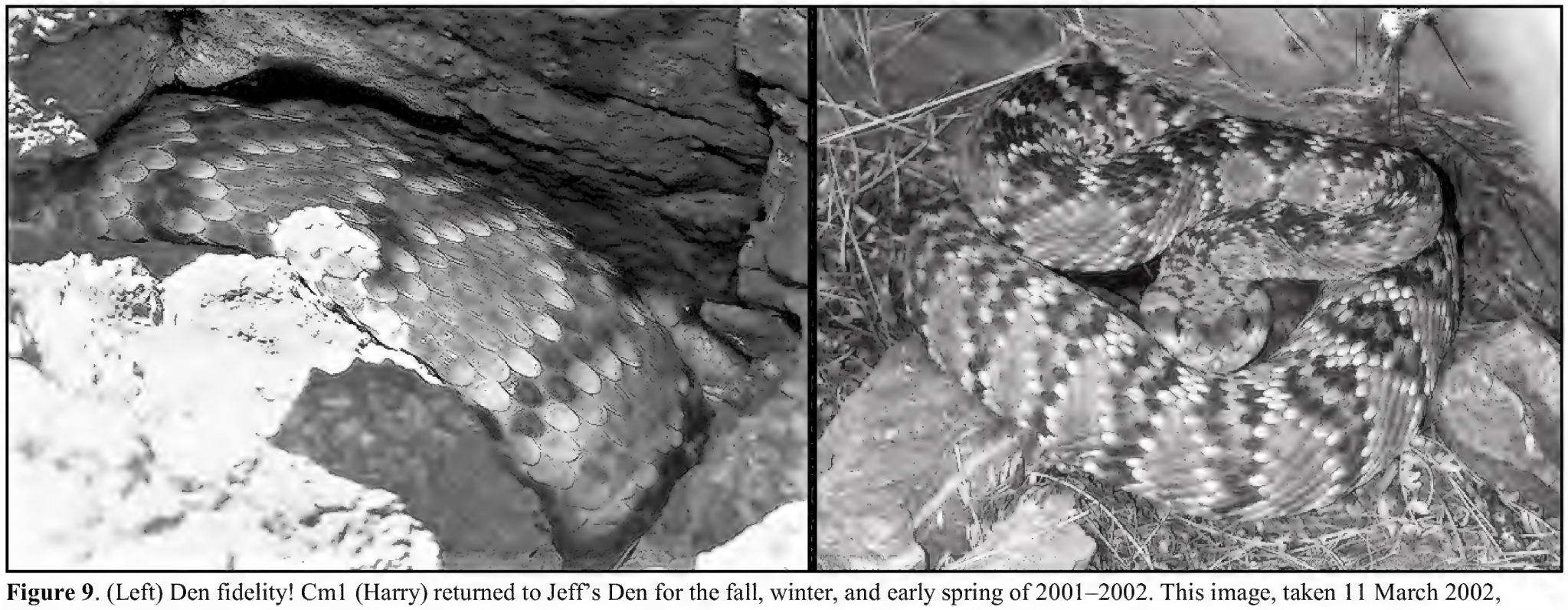

Figure 9. (Left) Den fidelity! Cm1 (Harry) returned to Jeff's Den for the fall, winter, and early spring of 2001–2002. This image, taken 11 March 2002, depicts him in one his favorite basking spots inside Jeff's Den. (Right) What a nice boy! This image shows Cm1 (Harry) on 29 March 2002. This was the day that we noticed he had egressed from Jeff's Den. Despite enduring the rigors of science for over a year, and overwintering in Jeff's Den for over four months, he is in remarkable health. Images by the author.

grab. You are entitled to your opinion about it, but *you* were *not* the one taking the risks. If I had it to do over, I'd do it again in a heartbeat. And if need be, again and again and again! As the one who did the grabbing, I am also entitled to an opinion. That opinion is that the end justified the means. The Suizo Mountain Project lasted nearly 15 years—with over 300 visitors, most of whom were students—without a single envenomation occurring. I rest my case.

Back to April Fools' Day 2001

Getting back to where we were, where were we? Oh, April of 2001! When we visited Jeff's Den with Team Bricker, said visit was two weeks after Harry's dramatic capture, and one week after his release. Harry was doing *exactly* what he was doing on his 16 March capture date. Nothing! Refer again to Figure 8, the left-hand image. That was Harry on 1 April as well. After all this talk of never seeing him again, Harry did *nothing* for over a month after release. He just hung out in Jeff's Den, and we started to worry about him. But he was just fine. He had been delaying egress in order to shed his skin.

After our less-than-impressive view of "do-nothing Harry" on this day, a signal check revealed that Hs1 (Geronimo) was nearby. We tracked him to a place best described as *way, way, way the hell out in the bajada.* He was now off the hill, and over 200 meters to the east of it. He was found buried in a packrat midden, not visible in any of the many exit/entrance holes. My take at the time was that he made this move because he was fleeing from Gordon's needle. In fact, my notes *and* my data-sheet for this day both say: "Run monster run." (At the time, I was mentally encouraging him to escape my herpetological vampire of a herp buddy. Physiologists—peh!). While the threat of Gordon's omnipresent needle was very real, I can't really say that Geronimo's *huge* movements were anything but normal for a spring-active male Gila Monster. Gordon's damnable hormonal bloodlust ended very quickly during the course of our study, and the remainder of our growing Gila Monster N had us leaving them unmolested after release. It was then that we learned that male Gila Monsters routinely made monstrous moves on their own accord during spring and early summer. Following the second tracking session with Geronimo, we headed back to my Tacoma, and drove back to the lower southwest side of Iron Mine Hill. We took a leisurely stroll to visit Ca1 (Ruth). She was still with her boyfriend, and had not changed location. Our last stop of round 1 of this day occurred at AD1, where we visited CaDead.

This visit to him occurred at 1315 hours, which was just prior to Gordon leaving the three of us for the rest of the day. At that point in time, CaDead had not moved so much as a millimeter, and a foul stench was emanating from him. I gave him a little poke with my snake tongs, and all that he did in response was stink up my tongs. Speaking of stink, there was plenty of stink eye cast upon Gordon's person as I uttered: "You really are an *asshole*! You *do* know that, don't you?" All three members of our party doubled over with laughter. Sure enough, CaDead was a DOR that Gordon had picked up on the way to our plot, and expertly posed just outside of AD1. Gordon had at some point quietly let the Brickers in on his little joke, and I was the last person to know of it. It is well the Gordon left when he did, for I really didn't think his April Fools' prank was all that funny. The joke got less funny when the *jerk* forgot to remove the snake that day—and so did I! The *really* "funny" part of his joke is that 24 hours later I was forced to make the long-ass drive all the way to our plot just to remove him (1.5 hours of drive time and ten bucks worth of gas. And let's not even talk about the wasted time taking data, or the images that I later tossed.). *Man* did CaDead stink that next day! On top of that, when I bare-handed him by the tail to move him, his body sort of oozed downward in sickening fashion, and broke into two slimy, stinky pieces. The anterior half of his body actually splattered as it audibly plopped to the ground. This was one of many parts of this day that I had forgotten all about until consulting my notes. I am also reminded that I never made good on the promise written on page 117 of my herp journal: "He who laughs last laughs best." It's coming Schuett, and when it hits you, it will be something *massive*! A monstrous "Peach pie" is already being prepared as these words are written.

As soon as assho—er uh, the good Dr. Schuett—left, the Brickers and I decided to road cruise in air-conditioned comfort in order to avoid the blazing heat of this day. Other than scads of lizards, we did not see anything special herp-wise. But we all got to see the finest remote stretches of Sonoran Desert that the area has to offer. Speaking of the best that the Sonoran Desert has to offer, we finished our round-trip scenic tour by returning to Iron Mine Hill. By the time we got there, it was 1807 hours, and the late afternoon temperatures were ideal for hiking. We passed by the active side of AD1 (the side opposite of CaDead), to note that a large *living* male *atrox* was now poised at the entrance. I would speculate that the pheromones wafting from Dianna and Patricia brought him back to the den with lustful intentions. Speaking of lustful snakes, we paid our last visit of the day to Ruth and her suitor. They were still together, and the male was still enthusiastically all over her with chin rubs and tail clamps. But any namesake of my mother was not going to yield easily. The poor guy was going to have to do more than he was doing on this evening to win her over. Active courtship between rattlesnakes can last for weeks, and today was *not* his lucky day!

As the last vestiges of the burning orb sank beneath the western horizon, and the lengthening shadows melded with the surrounding terrain, we wandered back to our chariot. We were easily able to pick our way back by the light of a glowing orange sky backlighting the silhouettes of jagged rows of peaks stretching forever into the surreal western landscape. Many a fine poet and songwriter has tried to capture the pure essence of the golden hour of the Sonoran Desert. As this author is merely a hack writer, the description above will have to do. Meanwhile, I *do* consider myself an expert wordsmith at what came next. I call it "night," which is best viewed under the blaze of parallel high beams shining their blessed light on the road ahead. Our circuitous route home allowed us to see many wondrous things. But the best of these was a male Sidewinder (*Crotalus cerastes*) who chose to crank his way across the breadth of those high beams of ours. I don't know why we don't have any images of this snake. My excuse is that I was likely out of film. It is up the Brickers to explain their reasons for the misdeed. Since I once

Figure 10. A "stand-in" image for a young male Sidewinder that was found on the evening of 1 April 2001. Image by the author.

accidentally got a good image of a male Sidewinder of similar size from the vicinity of this one, I share it here (Figure 10). The Bricker 'winder was special to me because it was the earliest in the year that I *ever* saw one on the move. Previous to this one, 9 April was the early-bird champ—and that had happened three times through the decades that I ambitiously sought their company.

It has been my pleasure to correspond with Kathy and Jim through the years. Their Christmas letters were always several pages long, and packed with adventures to faraway lands. They loved the northern limits of this planet, and traveled often to visit walrus, polar bears and caribou. Their environmental activism kept them busy as well, Kathy working long hours as chief fund-raiser for the Ocean Conservancy, and later, as the co-architect of the Mackinac Straits Raptor Watch. Since the fuse of life is so very short for many of us, I think it important to include some of the accomplishments of my Michigan friends. A list of Kathy's publications in the CHS *Bulletin* falls below my Literature Cited section. I also asked them for some impressions of their visit to Arizona over two decades ago. Here is what they had to say:

Coming from "shady sugar maples and white pines of northern Michigan," Jim reminisces that this Sonoran Desert experience opened his eyes. "Going out with people who have such passion and love for this hot thorny land and its creatures—wow! It doesn't get any better, except when you enjoy a cold beer afterwards." Kathy adds, "If we knew then what we know now about the ground-breaking nature of your work, we would have been too intimidated to ask to meet you. It's been our honor."

Figure 11. Nothing says "*I hate you*" like a gaping Gila Monster. This image of *Heloderma suspectum* #2 (Laura) was taken just prior to her release. The author will devote his next to column to this fantastic Gila Monster. Image by the author, 8 April 2001.

Vice versa. They got the cold beer part right! One of many major differences between Arizona and the hinterlands that they love so much is that we need to carry coolers to keep our beer cold! In wrapping up this column, the author wishes to relay that this is the first time *ever* that the full story of the origins of the Suizo Mountain Project's "Magnificent Seven" has been told. It would take a lifetime of columns to relay the stories of tragedy and triumph that these seven special performers pulled off before our very eyes during the initial years of our study. They didn't merely survive the first of the major drought cycles to grip the Southwest, they actually *thrived* in it. I will refer back to this column from time to time with future ramblings. The first of these "Magnificent Seven" columns will appear next month. It will be the story of the Gila Monster Laura. In Gordon's words, she became "The noun in our sentence." (I *think* that is a good thing?) In any case, without the serendipitous footwork accidentally set in motion by the presence of Jim and Kathy Bricker, our sentence may have forever been without that noun. I leave the reader with an image of Laura sending you all her own version of "love and hisses" (Figure 11).

This here is Roger Repp, signing off from Southern Arizona, where the turtles are strong, the snakes are handsome, and the lizards are above average.

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Birders among the Great Lakes herpers are invited to visit the Mackinac Straits Raptor Watch (which Kathy Bricker co-founded a decade ago) for the exhilarating spring migration of 60,000+ hawks and eagles. It tallies more Red-tailed Hawks right overhead than any other hawk watch in the country and more Golden Eagles than any other site east of the Mississippi. <www.mackinacraptorwatch.org>

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Green Treefrogs (*Hyla cinerea*) Overwintering in Limestone Crevices Near Their Northwestern Range Limit

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Abstract

Green Treefrogs (*Hyla cinerea*) use a variety of shelters as overwintering sites, the majority of which occur in terrestrial locations. I examined limestone bluff crevices in southwestern Illinois for the presence of amphibians and reptiles from October through the following April, 2015 through 2021. I detected Green Treefrogs in 12 crevices and observed one to three winters of continuous frog occupation in two of these crevices. My observations reveal that limestone bluff crevices provide suitable overwintering habitat for Green Treefrogs near their northwestern geographic range limit.

Introduction

Green Treefrogs (*Hyla cinerea*) are moderate-sized hylids (up to 5.7 cm body length; Powell et al., 2016) native to the southeastern United States. They range eastward across the Gulf Coastal Plain from central Texas to Florida and northward through the Atlantic Coastal Plain to the Chesapeake Bay region of Delaware, Maryland, and Virginia (Redmer and Brandon, 2003). Green Treefrogs range northward in the Mississippi River drainage to southeastern Missouri, southern Illinois, western Kentucky, and southwestern Indiana (Redmer and Brandon, 2003; Lodato et al., 2014). During the summer breeding season, Green Treefrogs inhabit a wide variety of water bodies including swamps, marshes, and margins of lakes and ponds (Redmer and Brandon, 2003). Outside of the breeding season Green Treefrogs frequent wetland edges, forests, old fields, and croplands (Wright and Wright, 1949; Dodd, 2013; Lodato et al., 2014).

Green Treefrogs appear to overwinter principally in terrestrial habitats. Documented and suspected overwintering sites include the interiors of rotten logs and stumps, within the bases of palmettos and cattails, under bark of rotting pine trees, within limestone bluff crevices, beneath limestone talus, within an iron pipe, within an abandoned mine, and between sheets of stacked plywood (Neill, 1948; Goin, 1955; Tinkle, 1959; Garton and Brandon, 1975; McAllister et al., 1995; Fontenot, 2011). Here, I investigate whether Green Treefrogs overwinter in limestone bluff crevices as proposed by Garton and Brandon (1975).

Methods

I conducted diurnal surveys for amphibians and reptiles along the base of west-facing limestone bluffs within LaRue-Pine Hills/Otter Pond Research Natural Area (LPH), Shawnee National Forest, Union County, Illinois. I examined bluff crevices from Otter Pond (37°32'23.5"N, 89°26'17"W) northward to 37°34'57.5"N, 89°26'21.5"W (geocoordinates approximated using Google Earth). I inspected bluff crevices on 128 dates from October through April, 2015 through 2021 (Table 1). I detected Green Treefrogs within crevices using natural light (frogs near

Table 1. Surveys of bluff crevices for amphibians and reptiles at LPH from October through April, 2015 through 2021.

Survey dates (inclusive)	Number of surveys
1 October 2015 – 25 April 2016	19
10 October 2016 – 29 April 2017	15
10 October 2017 – 11 April 2018	15
1 October 2018 – 23 April 2019	25
3 October 2019 – 7 April 2020	25
7 October 2020 – 12 April 2021	29

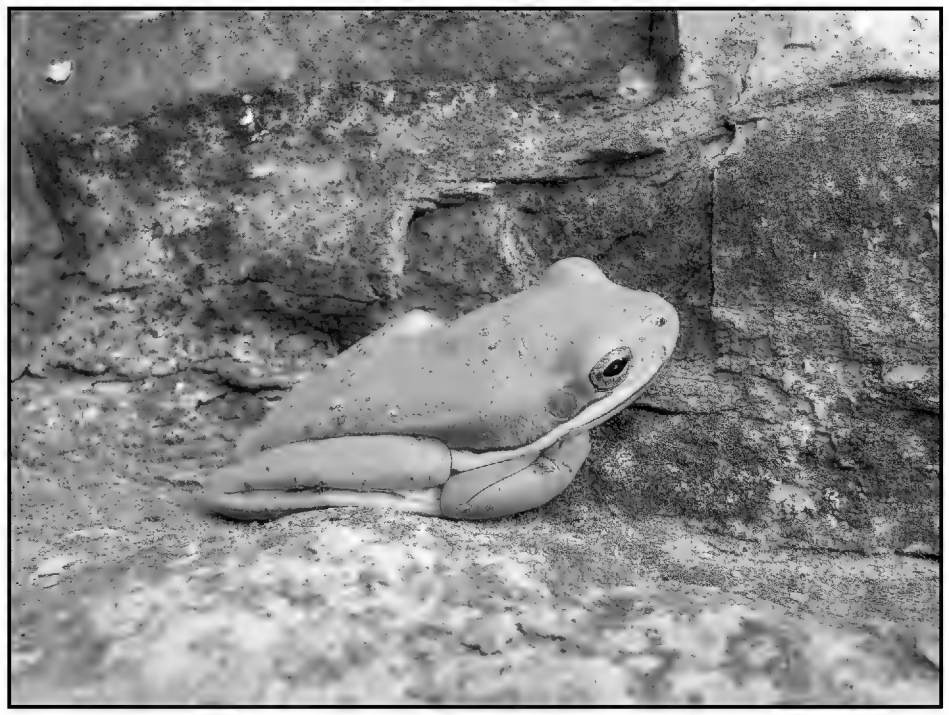

Figure 1. Green Treefrog on a bluff shelf near a horizontal bluff crevice, 9 November 2020. All photographs by the author.

crevice opening) or with a flashlight (frogs deep within crevice). I determined the orientation of each frog-occupied crevice with a compass and—for a subset of frogs—I determined the frog's height above the ground with a tape measure.

Results

I detected overwintering Green Treefrogs (Figure 1) wedged into 12 narrow (average width of nine crevices = 8.5 mm, range = 5–13 mm) bluff crevices (nine oriented horizontally and three oriented vertically) from autumn through spring, 2015 through 2021 (for examples of crevices see Figures 2–5). One crevice faced

Figure 2. Vertical bluff crevice inhabited by a Green Treefrog, 16 December 2015 through 17 March 2016. Plastic ruler denotes location of frog in crevice upon first detection 150 cm above the ground.

Figure 3. Vertical bluff crevice (with plastic ruler) inhabited by a Green Treefrog, 25 cm above the ground, 4 November 2020.

Figure 4. Horizontal bluff crevice inhabited by a Green Treefrog, 15 October 2015. Plastic ruler denotes crevice location 178 cm above the ground.

south (180°), three faced southwest (230–232°), six faced west (260–278°) and two faced northwest (300–332°). Green Treefrogs in vertical crevices ranged from 0 to 150 cm above ground whereas those in horizontal crevices ranged from 65 to 274 cm above ground. Although I detected some frogs only once, I spotted other frogs multiple times within the same crevice from autumn through spring. For example, I observed one Green Treefrog in vertical crevice 1, 135–150 cm above the ground, on seven dates from 16 December 2015 through 17 March 2016 (Table 2). Additionally, I observed 1 to 3 Green Treefrogs in vertical crevice 2, 0–10 cm above the ground on 11 dates from 6 November 2018 through 11 April 2019, 10 dates from 3 November 2019 through 19 March 2020, and 19 dates from 23 October 2020 through 30 March 2021 (Table 2). Subsequent examinations of these crevices after the last date of occupancy yielded no additional Green Treefrog observations, suggesting post-overwintering emergence.

Discussion

Whereas some temperate zone frog species employ cryoprotectants to survive freezing temperatures (Layne and Lee, 1995), others locate overwintering sites that are unlikely to freeze. Strategies to avoid freezing temperatures include burrowing or following channels into the soil below the frost line and overwintering in aquatic habitats or in caves (Pinder et al., 1992; Resetarits, 1986). Selection of unsuitable overwintering sites can be fatal. For example, anoxia can be fatal to frogs overwintering in aquatic environments (Pinder et al., 1992). Mortality of frogs overwintering in terrestrial environments is poorly documented (Pinder et al., 1992), but may be high under certain circumstances (Swanson and Burdick, 2010).

Garton and Brandon (1975) speculated that Green Treefrogs may overwinter in bluff crevices at LPH based on their discovery of two frogs in crevices in November 1968. My repeated observations of Green Treefrogs in two vertical bluff crevices at LPH from autumn through spring confirm bluff crevices provide suitable overwintering habitat for Green Treefrogs. In addition to the focal species, I observed one or more individuals of the following vertebrate species in the company of overwintering Green Treefrogs: Spotted Salamander (*Ambystoma maculatum*), Marbled Salamander (*Ambystoma opacum*), Cave Salamander (*Eurycea lucifuga*), Eastern Newt (*Notophthalmus viridescens*), Zigzag Salamander (*Plethodon dorsalis*), Bird-voiced Treefrog (*Hyla avivoca*), Northern Cottonmouth (*Agkistrodon piscivorus*), and Big Brown Bat (*Eptesicus fuscus*).

Figure 5. Horizontal bluff crevice inhabited by a Green Treefrog, 8 January 2016. Plastic ruler denotes location 145 cm above the ground.

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I thank Mary Boehler, Erin Palmer, and Joshua Vossler for frequently accompanying me afield and John MacGregor for confirming my bat identification. I also thank Joshua Vossler for gifting me a SureFire flashlight, and Bruce Kingsbury and Sasha Tetzlaff for lending me a borescope early during this investigation. Regrettably, the borescope camera was too wide to fit into the narrow crevices selected by Green Treefrogs and was, therefore, unusable.

Table 2. Dates when Green Treefrogs were detected in vertical bluff crevices 1 and 2 at LPH.

Vertical crevice	Dates on which Green Treefrogs were observed
1	16 Dec 2015, 8 Jan 2016, 14 Jan 2016, 21 Feb 2016, 6 Mar 2016, 13 Mar 2016, 17 Mar 2016
2	6 Nov 2018, 2 Dec 2018, 16 Dec 2018, 21 Mar 2019, 27 Mar 2019, 28 Mar 2019, 2 Apr 2019, 3 Apr 2019, 5 Apr 2019, 9 Apr 2019, 11 Apr 2019
2	3 Nov 2019, 4 Nov 2019, 21 Nov 2019, 11 Dec 2019, 28 Dec 2019, 10 Jan 2020, 3 Mar 2020, 4 Mar 2020, 5 Mar 2020, 19 Mar 2020
2	23 Oct 2020, 31 Oct 2020, 5 Nov 2020, 6 Nov 2020, 8 Nov 2020, 10 Nov 2020, 10 Dec 2020, 14 Jan 2021, 21 Jan 2021, 21 Feb 2021, 23 Feb 2021, 9 Mar 2021, 10 Mar 2021, 15 Mar 2021, 21 Mar 2021, 23 Mar 2021, 24 Mar 2021, 29 Mar 2021, 30 Mar 2021

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Bulletin of the Chicago Herpetological Society 57(2):37-39, 2022

Herpetology 2022

In this column the editorial staff presents short abstracts of herpetological articles we have found of interest. This is not an attempt to summarize all of the research papers being published; it is an attempt to increase the reader's awareness of what herpetologists have been doing and publishing. The editor assumes full responsibility for any errors or misleading statements.

ARBOREAL PREY-HANDLING BY CAPTIVE BOAS

W. G. Ryerson and C. Goulet [2021, Journal of Herpetology 55(1):26-32] note that prey-handling behavior serves as an important link between the processes of prey capture, transport, and swallowing. Snakes, lacking limbs, have developed a series of complex behaviors for the purposes of subjugating and handling their food. Using captive individuals of the semiarboreal *Boa constrictor*, the authors describe for the first time a set of behaviors unique to handling dead, endothermic prey in an arboreal context. Faced with the challenges of having to support the body weight of both themselves and their prey, boa constrictors create a series of loops that allow the body of the snake to support the prey item while also allowing for intraoral transport and swallowing. These loops can be adjusted and repositioned during transport, positioning the prey so that the pull of gravity is in line with swallowing.

DEAD SNAKES AND THEIR STORIES

G.-A. Ile et al. [2020, Herpetozoa 33:77-85] analyzed several morphological characters of 84 road-killed Caspian whipsnakes, *Dolichophis caspius*, from different areas of southern Romania. Most presented asymmetries in the total number of temporal scales, the temporal row and the periocular and labial scales. Almost a quarter of snakes had scars, located especially on the head and tail; many individuals had multiple injuries. The lowest rate of individuals with scars was found in the area with the least anthropogenic impact (Danube Gorge). This finding suggests that, in other areas in Romania, the species is threatened and lives in less optimal conditions. The number of individuals with asymmetries and scars differed according to the populated region, sex or size class. Most of the individuals were killed in August, due to the large number of road-killed juveniles.

HERPETOFAUNA DIVERSITY IN URBAN LANDSCAPES

K. S. Delaney et al. [2021, Ichthyology and Herpetology 109(2): 424-435] note that urbanization is a major contributor to habitat loss and fragmentation and is considered a global threat to biodiversity. The authors studied reptile and amphibian species diversity and abundance in a highly fragmented landscape adjacent to the second largest metropolitan area in the United States. Habitat patches in the study area were made up of remnant native vegetation surrounded by roads, housing, and other urban development. Species richness and diversity were positively associated with patch size, but patch age was not significantly associated with community characteristics. Four relatively common species were not detected in the small patches, indicating the possibility they had been extirpated by the time monitoring began, and six rarer species were not detected or detected only once in these patches. Although the patch size effect on species diversity was strong, the study found that several of the small habitat patches had similar diversity to large patches, indicating potential value of these small habitat patches in protecting species as "microreserves." In addition, one lizard species was found to be significantly more abundant in the smaller patches. To determine if abundance changed over time, capture rates were compared for four common lizards at the same sites ten years later. For three of the four species, abundance decreased over that period, specifically in the small patches. Although long-term monitoring has confirmed that the full suite of herpetofauna is currently preserved in the study area overall, declines even in the common species over time hint at the potential severity of the threat of urbanization to rare species.

COLOR PHASES OF EASTERN HOG-NOSED SNAKES

M. S. Lattanzio and M. J. Buontempo [2021, Herpetologica 77(2):134-145] note that animal coloration can benefit fitness via its function in homeostatic regulation, communication, or camouflage. For wide-ranging taxa that are exposed to diverse climatic conditions throughout their range, spatial variation in color morphology might reflect locality-specific adaptive responses to those variable conditions. As a result, these species might vary in their color-climate associations over geographic space. The authors integrate georeferenced photographs of adult animals with available bioclimatic data to test the hypothesis that dorsal color differences in eastern hog-nosed snakes (*Heterodon platirhinos*) reflect ecogeographic divergence. They first assigned each photographed snake into one of four dorsal color phases, namely, black, brown, red-orange, or yellow, and evaluated the spatial dispersion and bioclimatic niche occupancy of each phase by using multiple environmental niche modeling approaches. They then used pairwise comparisons of bioclimatic niche space to explicitly test for niche divergence among the color phases. Overall, black, brown, and red-orange phase *H. platirhinos* exploited different subsets of the species' geographic range and bioclimatic niche. In contrast, yellow phase snakes partly overlapped with red-orange and brown phase snakes in geographic and bioclimatic space. These findings support the authors' hypothesis, and they discuss some of the possible functions of phase coloration.

TOURISM AND CROCODILIANS

A. E. Rosenblatt et al. [2021, Herpetologica 77(4):289-293] note that wildlife tourism, including tourism involving large predators, is a rapidly growing industry that can generate many conservation and economic benefits. Monetary values can be derived for populations of large predators, and even individuals, on the basis of how much money tourists spend to see and interact with these awe-inspiring animals, but valuation studies only exist for a few groups of species. To help fill this gap the authors quantified the monetary value of crocodilians that are the focus of a wildlife tourism business in South America, the first time such a value has been calculated for crocodilians. They also compared the monetary values we derived with the monetary values of other crocodilians harvested in the hunting and farming industries during the same time period (2009–2014). They found mean minimum and maximum gross values of individual crocodilians per year as part of wildlife tourism were $422.00 USD and $566.67 USD, respectively, both higher than the mean gross value of individual crocodilians per year across hunting and farming industries ($300.29 USD). Individual crocodilians that were recaptured multiple times as part of wildlife tourism activities reached a peak value of $2700.00 USD. Thus, this study demonstrates that wildlife tourism can create substantial monetary incentives for local communities that coexist with crocodilians to work toward conservation goals. The authors conclude that wildlife tourism focused on crocodilians should be viewed as part of a larger strategy for conserving threatened populations, one that may include partners in the farming and hunting industries as well.

ARTIFICIAL COVER OBJECTS

J. M. Lemm and M. W. Tobler [2021, Herpetologica 77(4):307-319] note that artificial cover objects (ACOs) are known to attract small terrestrial vertebrates, but the actual parameters that attract species to ACOs can vary across geographic regions and climates. For this study ACOs were placed in coastal sage scrub and grassland habitats in southern California and surveyed weekly for small terrestrial vertebrates over a 4-yr period. The authors observed 1643 individuals of 34 taxa during 143 survey sessions totaling 16,312 ACO days. Overall species richness and abundances under ACOs were highest from February to April. The results showed that the probability of encountering a reptile under an ACO was highest in February and March under large wooden ACOs containing moist soil, when temperatures under the ACO were relatively mild, and when minimum air temperatures were low. At the community level, encounter probabilities for small mammals were highest for large wooden ACOs and ACOs with low soil moisture, with several species differences. Amphibians of three species were only captured in low numbers primarily under wooden ACOs from November to March. Use of ACOs in research and monitoring is an inexpensive and simple way to document and capture a wide variety of small terrestrial vertebrates. Species richness and abundance can be maximized over short periods using ACOs and can be equally important for long-term monitoring, particularly once the factors that make ACO use effective for small terrestrial vertebrates of a certain region have been investigated.

BURROWING ECOLOGY OF A TROPICAL LIZARD

J. Lei et al. [2021, Herpetologica 77(1):37-44] note that constructing burrows is energetically expensive, yet is a common trait across a broad spectrum of animals. The benefits of using burrows must therefore outweigh the costs of constructing burrows, which may reduce the risk of predation and/or ease the need for active thermoregulation. The authors examined the use of burrows in butterfly lizards (*Leiolepis belliana*), a common Southeast Asian lizard that constructs burrows in open, sandy plains. They used radiotelemetry to track the activity patterns and measured the thermal environment of 12 individuals across 14 d of sampling. It was found that *L. belliana* had high site fidelity, using the same burrows across the sampling period. There were significant differences between substrate temperatures inside and outside the burrow across the whole sampling period. However, the lower internal burrow temperature still exceeded the upper thermal tolerance of a similar sized lizard species during midday, and this probably explains why the authors did not observe lizards in their burrows during the middle of the day. Burrows were constructed in a shallow, Y-shaped, concave shape, with each of the three branches of the Y ending in a surface opening, a design that allows for easy escape if threatened by a predator. Due to burrow temperatures exceeding lethal body temperatures for much of the day, and the Y-shape structure of the burrows, the authors propose that the major function of burrows for this species is as a predator escape mechanism.

BREEDING SITE SELECTION BY GRAY TREEFROGS

A. B. Stoler and R. A. Relyea [2021, Ichthyology and Herpetology 109(3):785-790] note that breeding organisms rely on numerous environmental cues to determine optimal sites for oviposition. Site selection is often associated with factors that increase fitness, and the identification of these factors can help conservation efforts. For amphibians that breed in wetlands, the quality of terrestrial subsidies (e.g., leaf litter) can strongly influence larval survival and development by altering water chemistry and available nutrients. This study examined the preference of breeding gray treefrogs (*Hyla versicolor*) for wetlands containing litter species of varying chemical quality. Based on previous studies of larval survival, the authors hypothesized that treefrogs would oviposit more eggs into wetland mesocosms containing litter with high nutrient concentrations and low phenolic concentrations. To test this hypothesis, they counted the number of eggs oviposited by treefrogs in artificial wetland mesocosms containing either red maple (*Acer rubrum*), black oak (*Quercus velutina*), or eastern hemlock (*Tsuga canadensis*) litter. The study was conducted over two breeding seasons. Counter to the authors' hypothesis, they found that treefrogs preferred to oviposit in mesocosms containing maple litter, which contains high levels of both nutrients and phenolic acids. The authors discuss possible explanations for this result, including the possible anti-parasitic effects of phenolic acids. This is the first study demonstrating that breeding amphibians can differentiate between wetlands containing leaf litter species of differing chemistry. Given global declines in amphibian species concurrent with widespread changes in forest composition, our results emphasize the importance of considering leaf litter quality in wetland management and conservation efforts.

ATVs AND SOFTSHELL TURTLE NESTS

C. D. Godwin et al. [2021, Journal of Herpetology 55(2):201-207] note that recreational activities can be detrimental to biodiversity; for example, off-road vehicle traffic (e.g., ATV riding), which has become increasingly popular in recent decades, can threaten wildlife. Although ATV riding around wetlands may threaten the shallow nests of turtles, there are no data on the effect of ATVs on turtle nests. The authors studied nest site choice and nest survival in two species of softshell turtles (*Apalone mutica* and *A. spinifera*) along a river in Louisiana before (1993–1994) and after (2015–2016) ATV riding became popular at the site to determine whether ATVs were an important source of nest mortality, and whether there was an effect of nest site choice on nest survival. ATVs were the most common source of nest mortality (one-third of nests destroyed); nest mortality was significantly positively related to increased ATV traffic but was not influenced by species or nest site choice. Experiments with surrogate eggs and an ATV revealed that the most vulnerable nests to ATV mortality were those that were shallower, were driven over more slowly, and were turned upon. We recommend restricting the access of riding clubs to the river; enforcement of regulations on isolated riders from adjacent residential areas will be logistically and financially challenging.

DECLINE OF A FLORIDA BOX TURTLE POPULATION

M. T. Jones et al. [2021, Chelonian Conservation and Biology 20(2):200-210] report that the Florida box turtle (*Terrapene bauri*) population on Egmont Key National Wildlife Refuge, Florida, was the subject of long-term ecological studies from 1991 to 2006. The Egmont Key population was relatively large and stable compared with other populations of *Terrapene* spp. that were studied for multiple decades, with an increasing population trend and approximately 1500 turtles in 2002. The authors conducted a reassessment of the population in 2017–2018, and specifically evaluated the effects of a 26.1-ha wildfire that occurred in July 2016. In March 2017 the authors implemented randomized, time-constrained surveys, which detected an average of 38.5 dead box turtles per ha, from which they extrapolate approximately 1005 (95% CI = 786–1223) detectable, dead box turtles across the extent of the 2016 wildfire. Of 259 dead box turtles found during this survey, a minimum of 65 were judged to have died coincident with the 2016 wildfire. Another 43 turtles, apparently killed by predators (most likely raccoons, *Procyon lotor*), were found in burned and unburned areas. One hundred forty-eight were too badly burned or deteriorated to estimate the likely cause of death. Additional surveys in 2017 and 2018 further assessed the condition of the remaining box turtle population. Between March 2017 and March 2018 a total of 347 box turtles were detected, of which 32 were alive and 315 were dead. The authors estimated the population to consist of 65.5 (95% CI = 41.6–149.1) live turtles, indicative of a > 95% population decline since the early 2000s. These results illustrate the need for populations of nonlisted, yet vulnerable, species to be prioritized on protected sites, and monitored to detect the effects of stochastic, chronic, and synergistic sources of mortality.

Minutes of the CHS Board Meeting, January 14, 2022

A virtual meeting of the CHS board of directors via Zoom conference video/call was called to order at 7:35 P.M. Board members Stephanie Dochterman and John Gutierrez were absent. No nonmembers of the board were in attendance. Minutes of the December 17 board meeting were read and accepted.

Officers' reports

Treasurer: Rich Crowley shared the December financial report and discussed the year-end situation.

Vice-president: Rachel Bladow offered to put together a virtual New Year's party for the January 26 online meeting. Suggestions for content included a show & tell, a photo contest, a herp artwork contest, share your herp story, and break-out sessions for a herp trivia quiz. The winning entries from the photo and artwork contests could appear in the *Bulletin* along with a few lines from the winners.

Membership secretary: Mike Dloogatch read the list of those whose memberships have expired.

Committee reports

Adoptions: A completely new adoptions page has been added to the CHS website. Margaret Ann Paauw asked for help in confirming that people are paying the relinquishing or adoption fee. She is looking to find a way to streamline the follow-up payment confirmation.

New business

There was discussion of perhaps putting stories of successful adoptions in the *Bulletin*.

The meeting adjourned at 8:54 P.M.

Respectfully submitted by recording secretary Gail Oomens

NEW CHS MEMBERS THIS MONTH

Brynn Litus
Jennifer Rakstad
Samuel Zegers

Advertisements

For sale: **highest quality frozen rodents**. I have been raising rodents for over 30 years and can supply you with the highest quality mice available in the U.S. These are always exceptionally clean and healthy with no urine odor or mixed in bedding. I feed these to my own reptile collection exclusively and so make sure they are the best available. All rodents are produced from my personal breeding colony and are fed exceptional high protein, low fat rodent diets; no dog food is ever used. Additionally, all mice are flash frozen and are separate in the bag, not frozen together. I also have ultra low shipping prices to most areas of the U.S. and can beat others shipping prices considerably. I specialize in the smaller mice sizes and currently have the following four sizes available: Small pink mice (1 day old—1 gm) , $25 /100; Large pink mice (4 to 5 days old—2 to 3 gm), $27.50 /100; Small fuzzy mice (7 to 8 days old—5 to 6 gm), $30/100; Large fuzzy mice / hoppers (10 to 12 days old—8 to 10 gm), $35/100 Contact Kelly Haller at 785-224-7291 or by e-mail at kelhal56@hotmail.com

FREE – but you need to get them. I will not part-out portions/separate issues of any journal. *Journal of Herpetology*, Vols. 15-45 (1981-2011) and *Herpetological Review* covering 1981-2011; *Herpetologica*, Vols. 38-54 (1982-1998); *Herpetological Monographs*, Nos. 2, 3, 5-12, 14; *Chelonian Conservation & Biology*, Vols. 1-3 (4 issues each); *Turtle & Tortoise Newsletter*, Issues 1-8; *Southwestern Naturalist*, Vol. 29 (3, 4) through Vol. 33. Contact: Dave at drlong@ship.edu. Located in Shippensburg, Pennsylvania.

Line ads in this publication are run free for CHS members—$2 per line for nonmembers. Any ad may be refused at the discretion of the Editor. Submit ads to mdloogatch@chicagoherp.org.

UPCOMING MEETINGS

Please try to join us online for the next meeting of the Chicago Herpetological Society, to be held at 7:30 P.M., Wednesday, February 23. A link to the Zoom webinar will be sent by email to all members who have supplied us with an email address. The speaker will be **Sarah Goodnight**, a Ph.D. candidate at Florida Atlantic University: Harbor Branch, in Fort Pierce, Florida, who studies disease ecology in freshwater insects and amphibians.. Sarah's program is titled "Worms Got Your Tongue? Oral Parasites Affect Acoustic Communication and Mate Attraction in Green Treefrogs."

Sarah's research interests include parasite-mediated sexual selection in tree frogs, cannibalism and its impacts on disease transmission, and genetic diversity of parasites with complex (multiple-host) life cycles. She particularly enjoys her work with amphibians, keeps several species of frog as pets, and is happiest when she can grab her waders and dipnet to explore local ponds.

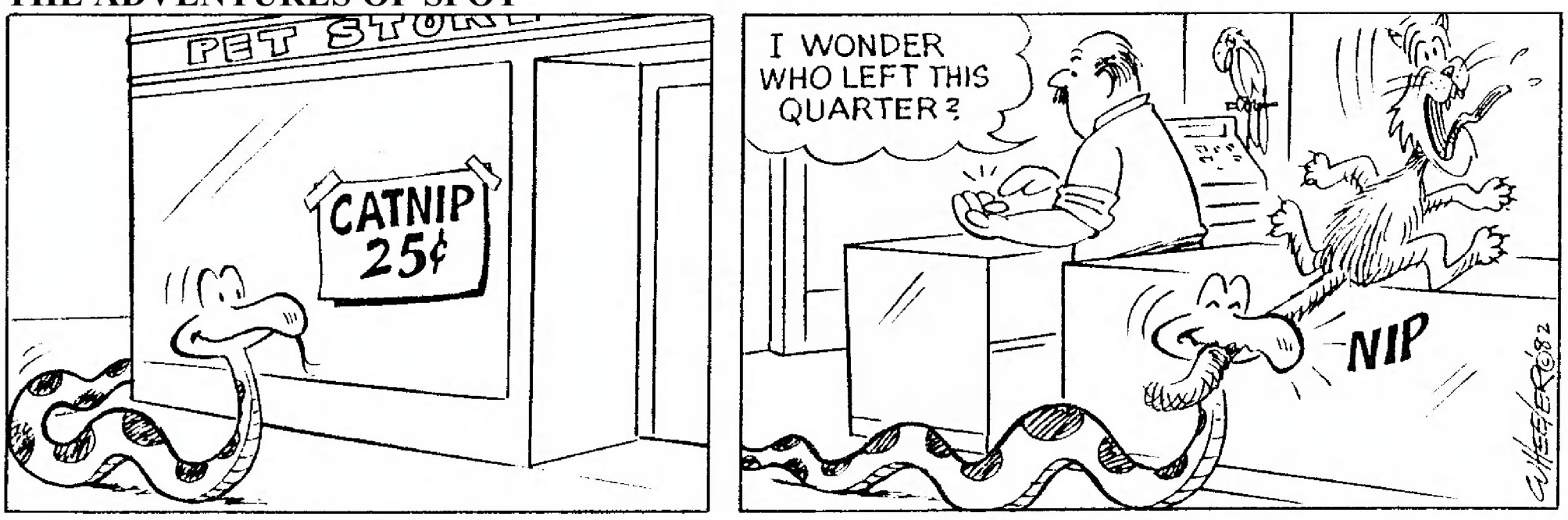
A program for the March 30 meeting has not yet been confirmed.

Please check the CHS website or Facebook page each month for information on the program. Information about attending a Zoom webinar can be found here:
<https://support.zoom.us/hc/en-us/articles/115004954946-Joining-and-participating-in-a-webinar-attendee->

Board of Directors Meeting

Are you interested in how the decisions are made that determine how the Chicago Herpetological Society runs? And would you like to have input into those decisions? The next board meeting will be held online. If you wish to take part, please email: mdloogatch@chicagoherp.org.

THE ADVENTURES OF SPOT



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